

**2000
Edition
Student Manual**

6c

**Carrier
Requirements
(Rail)**



**HAZARDOUS MATERIALS TRANSPORTATION
TRAINING MODULES**



U.S. Department of Transportation
Research and Special Programs
Administration

Script

Visual

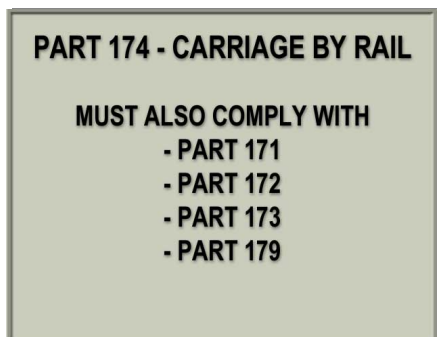
Narrative

1



Module 6C – Carrier Requirements (Rail)

2



Hazardous materials shipments by rail must comply with the requirements of Part 174 as well as those contained in Parts 171, 172, 173 and 179.

174.1

3



No person may accept for transportation or transport by rail any hazardous material shipment that does not comply with the requirements of the HMR.

174.3

4

ACCEPTANCE

Railroad's haz mat must be
in compliance
Shipper Certification - not required

A railroad transporting its own supplies of hazardous materials must also meet the requirements of the HMR. A shipper's certification is not required on the shipping paper when a railroad is transporting its own supplies.

174.5**5**

ACCEPTANCE

HMR do not apply to:
- Torpedoes
- Fusees

The requirements of the HMR do not apply to railway torpedoes and fusees when carried in engines or rail cars. Torpedoes must be in metal boxes when not in use.

174.5

STUDENT RESPONSE NOTE 1-5

A shipper _____ is not required on a shipping paper when a railroad transports its own hazardous materials and supplies.

6

INSPECTION

Inspect rail car containing HM
- At each location where HM is accepted
or placed in train
- For required markings, labels, placards,
closures, leakage

A rail carrier must inspect, at each location where a hazardous material is accepted or placed in a train, each rail car containing hazardous materials, at ground level, for required markings, labels, placards, securement of closures, and for leakage.

174.9

7

DISPOSITION OF SHIPMENTS**Must forward**

- Within 48 hours, or
- On first available train

A carrier must forward shipments of hazardous materials promptly and within 48 hours after acceptance (not counting Saturdays, Sundays and holidays). Carriers that provide only weekly or biweekly service must forward hazardous material shipments on the first available train.

Division 2.1 (flammable gas), Division 2.3 (poisonous gas) or Class 3 (flammable liquid) loaded in a tank car may not be received and held at any point, subject to the forwarding orders.

174.14(a)(b)

STUDENT RESPONSE NOTE 6-7

Generally speaking, hazardous materials shipments must be forwarded within _____ of acceptance and the consignee must remove the shipments within 48 hours.

8

ADDITIONAL RESTRICTIONS

May be imposed by rail carrier

Must be reported to BOE for publication

A rail carrier may impose additional restrictions on a hazmat shipment when local conditions make acceptance, transportation or delivery unusually hazardous. The carrier must report additional local restrictions to the Bureau of Explosives for publication.

174.20

9



Bulk packaging containing a hazardous material in trailer-on-flat-car (TOFC) or container-on-flat-car (COFC) service must meet the requirements in 174.63 or be approved by the Associate Administrator for Safety of the Federal Railroad Administration.

174.63(a)

10



A bulk packaging containing a hazardous material may be transported inside a fully closed transport vehicle or freight container if it is properly secured so it will not change position, slide into other packages or the walls of the transport vehicle or freight container during normal transportation conditions.

Bulk packaging not in conformance with and subject to these requirements, may be transported in COFC or TOFC service subject to the conditions in 174.63(c)(1)-(6).

Please pause the presentation and read 174.63(c)(1)-(6).

174.63(b)(c)

11



A rail carrier may not transport a cargo tank or multi-unit tank car tank containing a hazardous material in TOFC/COFC service unless this service is approved by the Associate Administrator for Safety, FRA. In the event of an incident, prior approval is not required if there is a need to move the cargo tank to mitigate the consequences of the incident. Such movement must be limited to transportation necessary under emergency conditions.

174.63(e)

STUDENT RESPONSE NOTE 8-11

In an emergency, a ____ tank containing a hazardous material may be moved without prior approval.

12

HM SEGREGATION																
SEGREGATION TABLE FOR HAZARDOUS MATERIALS																
Class or Division	Notes	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.4	3	4.1	4.2	5.1	5.2
Explosives	1.1	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Very insensitive explosives	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extremely insensitive explosives	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable gases	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-toxic, non-flammable gases	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poisonous gas Zone A	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poisonous gas Zone B	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable liquids	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable solids	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spontaneously combustible materials	4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dangerous when wet materials	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidizers	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corrosives	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone A, toxic PG I	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone B, toxic PG II	6.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radioactive materials	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corrosive liquids	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Hazardous materials must be segregated in loading, transportation and storage according to the Segregation Table for Hazardous Materials in 174.81(d). Hazard classes in the left hand column are matched with hazard classes reading across the top. A blank space at the intersection of two classes means there is no restriction.

174.81(d))

13

HM SEGREGATION																
SEGREGATION TABLE FOR HAZARDOUS MATERIALS																
Class or Division	Notes	1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	2.4	3	4.1	4.2	5.1	5.2
Explosives	1.1	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Explosives	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Very insensitive explosives	1.5	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extremely insensitive explosives	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable gases	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-toxic, non-flammable gases	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poisonous gas Zone A	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poisonous gas Zone B	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable liquids	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flammable solids	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spontaneously combustible materials	4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dangerous when wet materials	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Student Activity

Determine whether Class 3 (Flammable liquid) and Division 2.1 (Flammable gas) materials may be placed together.

In the Segregation Table, please find Class 3 in the left column and then find Division 2.1 in the top row. Now find the intersection for these two materials. The space of the intersection is blank indicating there are no restrictions for loading, transporting or storing these two materials.

174.81(e)

STUDENT RESPONSE NOTE 12-13

The Segregation Table for Hazardous Materials in _____ shows which hazardous materials may or may not be loaded, transported or stored together.

14

HM SEGREGATION

SEGREGATION TABLE FOR HAZARDOUS MATERIALS

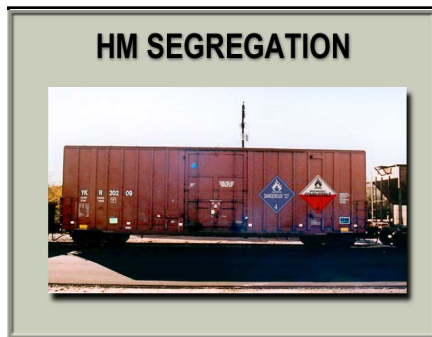
Class or Division	Notes	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 gas Zone A	2.3 gas Zone B	3
Explosives	A	*	*	*	*	*	X	X	X	X	X
Explosives	B	*	*	*	*	*	X	X	X	X	X
Explosives	C	*	*	*	*	*	X	X	X	X	X
Explosives	D	*	*	*	*	*	X	X	X	X	X
Very insensitive explosives	E	*	*	*	*	*	X	X	X	X	X
Extremely insensitive explosives	F	*	*	*	*	*	X	X	X	X	X
Flammable gases	2.1	X	X	O	X	X	X	X	O	O	O
Non-toxic, non-flammable gases	2.2	X	X	O	X	X	X	X	O	O	O
Poisonous gas Zone A	2.3	X	X	O	X	X	X	X	O	O	O
Poisonous gas Zone B	2.3	X	X	O	X	X	X	X	O	O	O
Flammable liquids	3	X	X	O	X	X	X	X	O	O	O
Flammable solids	4.1	X	X	O	X	X	X	X	O	O	O
Spontaneously combustible materials	4.2	X	X	O	X	X	X	X	O	O	O
Dangerous when wet materials	4.3	X	X	O	X	X	X	X	O	O	O

An “X” means the materials may not be loaded, transported or stored together in the same rail car or storage facility.

An “O” at an intersection means these materials may be loaded, transported or stored together provided there is some method to keep their contents separate in the event of leakage. For example, with proper separation, Class 3 (Flammable Liquids) may be stored with Division 1.4 (Explosives.)

174.81(d)(e)

15



As we have learned, some materials have primary and subsidiary hazards. In segregating hazardous materials, the segregation appropriate to the subsidiary hazard must be applied when it is more restrictive than the segregation for the primary hazard.

But hazardous materials in the same hazard class may be stowed together, without regard to segregation required by the subsidiary hazard, if the materials are not capable of reacting dangerously with each other.

174.81(e)(6)

16

HM SEGREGATION

SEGREGATION TABLE FOR HAZARDOUS MATERIALS

1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 gas Zone A	2.3 gas Zone B	3
*	*	*	*	*	X	X	X	X	X
*	*	*	*	*	X	X	X	X	X
*	*	*	*	*	X	X	X	X	X
*	*	*	*	*	X	X	X	X	X
X	X	O	X	X	X	X	X	X	X
X	X	O	X	X	X	X	X	X	X
X	X	O	X	X	X	X	X	X	X
X	X	O	X	X	X	X	X	X	X

An asterisk indicates that segregation among different Class 1 materials is governed by the Compatibility Table for Class 1 (Explosive) materials in 174.81(f).

Please pause the presentation and familiarize yourself with 174.81(f).

174.81(f)

STUDENT RESPONSE NOTE 14-16

An “_” indicates the materials may not be loaded, transported or stored together.

17

Unloading of a tank car must be performed by a reliable person who has been trained and is responsible for the safe unloading. Brakes must be set and the wheels blocked on all cars being unloaded. Also, caution signs to warn approaching persons must be placed on the track or on the car; pressure must be relieved before opening manhole covers or outlet valve caps, and safety procedures must be followed when breaking seals, opening manhole covers and performing unloading operations.

174.67(a)-(n)

18

Unloading connections for tank cars must be securely attached to unloading pipes. After unloading is completed, a tank car may not be allowed to stand with unloading connections attached. A tank car must be attended or monitored by the unloader during the period of unloading and while the tank car is connected to the unloading device.

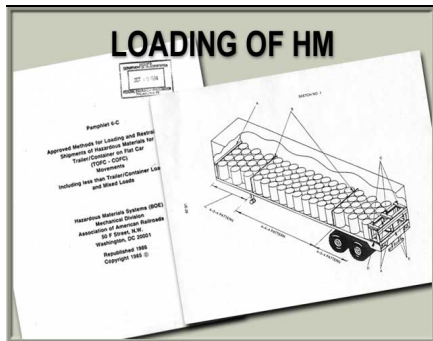
Note: Non-human monitoring is currently only allowed by exemption.

174.67(h)-(i)

STUDENT RESPONSE NOTE 17-18

Unloading operations of a tank car must be _____ either by a person, electronically or a combination thereof.

19



Each package containing a hazardous material that is being transported by rail in a freight container or a transport vehicle must be loaded so that it cannot fall or slide. The packages must be protected so that other freight cannot fall onto or slide into it. If other freight can't protect the packages, blocking and bracing must be used.

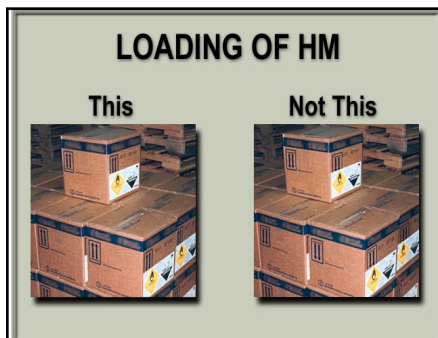
For blocking and bracing examples, see the Bureau of Explosives pamphlets Nos. 6 and 6c.

174.55(a)

STUDENT RESPONSE NOTE 19

Packages must be protected from movement or shifting around while in transportation, either by using other freight or by _____ and bracing.

20



Each package containing a hazardous material that bears orientation markings must be loaded so that the markings are pointing in an upright position.

174.55(b)

21



The doors of a freight container or transport vehicle may not be used to secure a load with a package containing a hazardous material unless the doors meet the design strength specifications for freight containers and trailers.

The specifications are M-930 for freight containers and M-931 for trailers in the AAR Manual of Standards and Recommended Practices.

174.55(c)

22

LEAKAGE**Remove Leakage**

- in rail car,
- and
- on railroad property

All hazardous material that has leaked from a package in a rail car or on other railroad property must be carefully removed.

174.57

23

**LOADING
CLASS 1 EXPLOSIVES**

Subpart E—Class 1 (Explosive) Materials

§ 174.101 Loading Class 1 (explosive) materials.

(a) Boxes containing Division 1.1 or 1.2 (Class A explosive) materials must be loaded so that the ends of wooden boxes will not bear against sides of any fiberboard boxes and so that the end of any box will not cause a projection point on a small area of another box.

(b) Explosive bombs, unfuzed projectiles, rocket ammunition and rocket motors, Division 1.1, 1.2, or 1.3 (Class A or B explosive) materials, which



Class 1 (Explosive) materials must be loaded for rail transportation according to detailed requirements in Subpart E of Part 174, as applicable. The requirements address procedures for proper loading and securing of Class 1 explosives in order to ensure safe rail transportation of these materials.

174.101-174.115

24

ACCEPTANCE**HM Shipments must be:**

- **Classed**
- **Described**
- **Packaged**
- **Marked**
- **Labeled**

A rail carrier may only accept a hazardous material for transportation that is properly classed, described on a shipping paper, packaged, marked and labeled. Without the required shipping papers, a car containing hazardous materials must not be accepted for transportation by rail.

174.24**STUDENT RESPONSE NOTE 20-24**

Only shipments that are properly described on _____ papers may be accepted for transportation.

25

DEFINITION

Train means one or more engines coupled with one or more rail cars, except...

Requirements for carrying shipping papers and other hazmat-related documents depend on when car movement takes place in a “train.” The HMR define a train as “one or more engines coupled with one or more rail cars, except during switching operations or where the operation is that of classifying and assembling rail cars within a railroad yard for the purpose of making or breaking up trains.”

171.8

26

DEFINITION

FRA:

"A train exists

- when federal air brake rules apply to train movement, or
- when picking up or setting out cars at interchanges or industry."

To clarify the definition, the FRA has issued clarification guidance, which says a “train” exists:

- when federal air brake rules apply to train movement (49 CFR Part 232), or
- when picking up or setting out cars at interchanges or industry.

FRA Memorandum HM 96-05 dated 31 May 1996

STUDENT RESPONSE NOTE 25-26

The HMR define a train as ____ or more engines coupled with one or more rail cars, except during switching operations or where the operation is that of classifying and assembling rail cars within a railroad yard for the purpose of making or breaking up trains.

27

REQUIRED DOCUMENTATION**Train Crew Must Carry:**

- Shipping papers
- Document showing current position of rail car carrying HM

In addition to shipping papers, a train crew must also carry a document showing the current position in a train of each rail car containing a hazardous material. A train consist satisfies this requirement.

A train crew member must update the document to show changes in the position of cars within a train containing hazardous materials.

174.26**STUDENT RESPONSE NOTE 27**

The position of cars containing hazardous materials are generally shown on the _____.

28

MARKINGS and PLACARDS

No person may transport a rail car carrying a hazardous material unless it displays required markings and placards. Placards and car certificates lost in transit must be replaced at the next inspection point. Those not required must be removed at the next terminal where the train is classified.

174.59

29

SWITCHING

Switching placarded rail cars requires certain considerations when the use of hand brakes is necessary.

Hand brakes must be tested to make sure they're working properly before cutting off cars during switching operations.

Cars with switching restrictions must clear the lead before other cars can be cut off in motion.

174.83(a)(1)-(3)

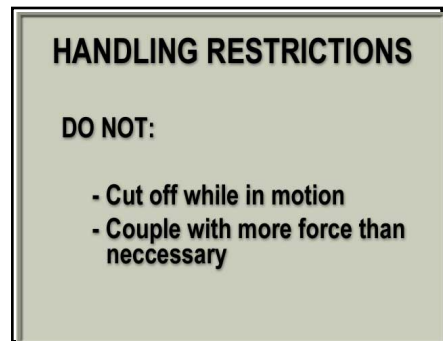
30

Strict handling restrictions apply to any rail car that is placarded:

- Division 1.1 Explosives,
- Division 1.2 Explosives,
- Division 2.3, Zone A, Poisonous Gases,
- Division 6.1, PG I, Zone A, Poisonous Liquids,
- DOT 113 tank cars placarded Division 2.1 Flammable Gas.

These placards must be displayed on a white square background.

172.510;174.83(b)

31

The cars may not be

- cut off while in motion,
- struck by any car moving under its own momentum,
- or coupled into with more force than necessary to make the coupling.

Note: Most carrier operating rules specify coupling speed of no more than 4 mph; this is not a Federal regulatory requirement.

174.83(b)(1)-(3)

32**HANDLING RESTRICTIONS**

Do not cut off while in motion
Do not strike placarded cars
Do not couple with excessive force

A placarded flatcar, or a flatcar carrying a placarded transport vehicle, freight container, or bulk packaging, may not be cut off while in motion.

No rail car moving under its own momentum may strike any placarded flatcar, or any flatcar carrying a placarded transport vehicle, freight container, or bulk packaging.

A placarded flatcar or a flatcar carrying a transport vehicle, freight container or bulk packaging may not be coupled into with more force than is necessary to complete the coupling.

174.83(c)-(e)

33**TRAIN PLACEMENT**

Separate
Div. 1.1 and 1.2 from engine
By at least one non-placarded car

Cars placarded Division 1.1 or 1.2 explosives face additional restrictions while being handled in a terminal, yard or siding. They must be separated from the engine by at least one non-placarded car, and they must be placed in a location that is safe from danger of fire. The cars may not be placed under a bridge or overhead crossing or near a passenger shed or station except during transfer operations.

174.83(f)

STUDENT RESPONSE NOTE 28-33

Rail cars placarded Div. 1.1 or Div. 1.2 must be separated from the engine by at least ____ non-placarded car.

34



In a train, placarded cars have to be positioned according to strict rules of separation. These rules are listed in a table in 174.85(d).

The table organizes placards into groups based on hazard classification.

174.85(d)

35

TRAIN PLACEMENT		
PLACARD GROUP 1	PLACARD GROUP 3	PLACARD GROUP 4
Div. 1.1 Div. 1.2	Div. 2.3 (PG I, Zone A) Div. 6.1 (PG I, Zone A)	Class 7

Placard Group 1 includes Division 1.1 and 1.2 (Explosives.)

Placard Group 3 includes Division 2.3 (PG I, Zone A; poisonous gas) and Division 6.1 (PG I, Zone A; poisonous liquid.)

Placard Group 4 contains Class 7 (Radioactive) materials.

174.85(d)

36

TRAIN PLACEMENT		
PLACARD GROUP 2		
Div. 1.3	Class 2	Class 5
Div. 1.4	Class 3	Class 6
Div. 1.5	Class 4	Class 8

Placard Group 2 includes Division 1.3, 1.4, 1.5; Class 2 (not including Division 2.3, PG I, Zone A); Class 3; Class 4; Class 5; Class 6 (not Div. 6.1, PG I, Zone A); and Class 8.

174.85(d)

37

TRAIN PLACEMENT						
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS						
RESTRICTIONS	Placard Group 1	Placard Group 2		Placard Group 3		Placard Group 4
	Rail Car	Tank Car	Rail Car	Tank Car	Rail Car	Rail Car
1. When train length permits, placarded car may not be nearer than the sixth car from the engine or occupied caboose.	X	X		X		
2. When train length does not permit, placarded car must be placed near the middle of the train, but not nearer than the second car from an engine or occupied caboose.	X	X		X		
3. A placarded car may not be placed next to an open-top car when any of the loading in the open-top car protrudes beyond the car ends, or if the loading spilled, would protrude beyond the car ends.	X	X		X		
4. A placarded car may not be placed next to a labeled flat car, except closed TOPGOCOPC equipment, auto carriers, and other specially equipped cars with tie-down devices for securing vehicles. Permitted bulk head flat cars are considered the same as open-top cars.	X	X		X		
5. A placarded car may not be placed next to any transport vehicle or freight container having an internal combustion engine or an open-flame device in operation.	X	X		X		
6. Placarded cars may not be placed next to each other based on the following:						
Placard Group 1	X	X	X	X	X	X
Placard Group 2	X	X	X	X	X	X
Placard Group 3	X	X	X	X	X	X
Placard Group 4	X	X	X	X	X	X

Reading down the left side of the table, there are six placement restrictions. The four placard groups read left to right across the top of the table. The table is arranged to show an X under the type of placarded car where each restriction applies.

174.85(d)

38

TRAIN PLACEMENT						
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS						
RESTRICTIONS	Placard Group 1	Placard Group 2		Placard Group 3		Placard Group 4
	Rail Car	Tank Car	Rail Car	Tank Car	Rail Car	Rail Car
1. When train length permits, placarded car may not be nearer than the sixth car from the engine or occupied caboose.	X	X		X		
2. When train length does not permit, placarded car must be placed near the middle of the train, but not nearer than the second car from an engine or occupied caboose.	X	X		X		
3. A placarded car may not be placed next to an open-top car when any of the loading in the open-top car protrudes beyond the car ends, or if the loading spilled, would protrude beyond the car ends.	X	X		X		
4. A placarded car may not be placed next to a labeled flat car, except closed TOPGOCOPC equipment, auto carriers, and other specially equipped cars with tie-down devices for securing vehicles. Permitted bulk head flat cars are considered the same as open-top cars.	X	X		X		
5. A placarded car may not be placed next to any transport vehicle or freight container having an internal combustion engine or an open-flame device in operation.	X	X		X		
6. Placarded cars may not be placed next to each other based on the following:						
Placard Group 1	X	X	X	X	X	X
Placard Group 2	X	X	X	X	X	X
Placard Group 3	X	X	X	X	X	X
Placard Group 4	X	X	X	X	X	X

Placard groups 1 and 4 contain rail cars only.

Placard groups 2 and 3 are subdivided into rail cars and tank cars, because both types of cars may be used to carry the hazardous materials in these groups.

174.85(d)

39

TRAIN PLACEMENT						
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS						
RESTRICTIONS	Placard Group 1	Placard Group 2		Placard Group 3		Placard Group 4
	Rail Car	Tank Car	Rail Car	Tank Car	Rail Car	Rail Car
1. When train length permits, placarded car may not be nearer than the sixth car from the engine or occupied caboose.	X	X		X		
2. When train length does not permit, placarded car must be placed near the middle of the train, but not nearer than the second car from an engine or occupied caboose.	X	X		X		

Restriction #1 reads, “When train length permits, placarded car may not be nearer than the sixth car from the engine or occupied caboose.” Restriction #2 reads, “When train length does not permit, placarded car must be placed near the middle of the train, but not nearer than the second car from an engine or occupied caboose.” The table indicates that restrictions 1 and 2 apply to Placard Group 1 rail cars, and to tank cars in Groups 2 and 3.

174.85(d)

STUDENT RESPONSE NOTE 34-39

There must be at least ____ rail cars between a placarded railcar and the engine or an occupied caboose if train length permits.

40

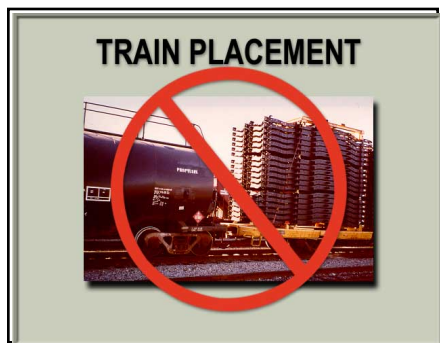
TRAIN PLACEMENT					
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS—Continued					
RESTRICTIONS	Placard Group 1 Rail Car	Placard Group 2 Tank Car	Placard Group 3 Rail Car	Placard Group 4 Tank Car	Placard Group 4 Rail Car
3. A placarded car may not be placed next to an open-top car when any of the lading in the open-top car protrudes beyond the car ends, or if the lading shifted, would protrude beyond the car ends.	X	X	X		
4. A placarded car may not be placed next to a loaded flat car, except closed TOFC/COFC equipment, auto carriers, and other specially equipped cars with tie-down devices for securing vehicles. Permanent bulk head flat cars are considered the same as open-top cars.	X	X	X		
5. A placarded car may not be placed next to any transport vehicle or freight container having an internal combustion engine or an open flame device in operation.	X	X	X		

Restrictions #3, 4 and 5 apply to Placard Group 1 rail cars, and Placard Groups 2 and 3 tank cars.

Restriction #3 says that a placarded car may not be placed next to an open-top car when any of the lading in the open top car protrudes beyond the car ends or would protrude if the lading shifted.

174.85(d)

41



Restriction #4: A placarded car may not be placed next to a loaded flatcar that does not have permanent bulkheads.

This restriction does not apply if the flatcar is loaded with closed COFC or TOFC equipment, or if the flatcar is an auto carrier or has other equipment with tie-down devices for securing vehicles.

174.85(d)

42

TRAIN PLACEMENT					
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS—Continued					
RESTRICTIONS	Placard Group 1 Rail Car	Placard Group 2 Tank Car	Placard Group 3 Rail Car	Placard Group 4 Tank Car	Placard Group 4 Rail Car
5. A placarded car may not be placed next to any transport vehicle or freight container having an internal combustion engine or an open flame device in operation.	X	X	X		

Restriction #5: A placarded car may not be placed next to any transport vehicle or freight container having an internal combustion engine or an open flame device in operation.

174.85(d)

43

TRAIN PLACEMENT						
POSITION IN TRAIN OF PLACARDED CARS TRANSPORTING HAZARDOUS MATERIALS						
RESTRICTIONS	Placard Group 1	Placard Group 2		Placard Group 3		Placard Group 4
	Rail Car	Tank Car	Rail Car	Tank Car	Rail Car	Rail Car
6. Placarded cars may not be placed next to each other based on the following:						
Placard Group 1		X	X	X	X	X
Placard Group 2	X		X	X	X	X
Placard Group 3	X	X		X	X	X
Placard Group 4	X	X	X	X		

Restriction #6 explains which placarded cars may not go next to each other. The table shows that for each Placard Group the restriction applies to every other Placard Group. In other words, cars from the same placard group may be placed next to each other. And cars from different placard groups may not.

174.85(d)

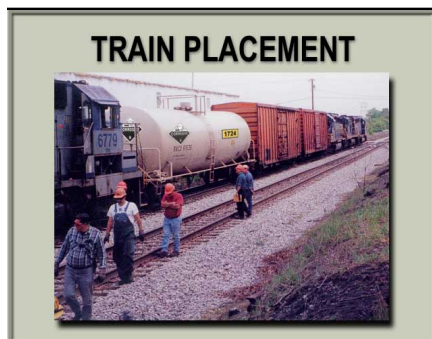
44



There are additional placement restrictions not covered in the Table. A car placarded RADIOACTIVE must be separated by at least one non-placarded car from a locomotive, an occupied caboose, or a carload of undeveloped film.

174.85(b)

45



Tank cars containing the residue of a hazardous material must be separated by at least one non-placarded car from a locomotive or occupied caboose.

174.85(c)

46

TRAIN PLACEMENT

Place escorted cars
(placarded Div. 1.1, 1.2, 2.3, 6.1)
next to/ahead of car carrying
escorts/guards

Escorted cars must be placed next to or ahead of the car occupied by the guards or technical escorts if they are placarded:

- Division 1.1 or 1.2 (explosives)
- Division 2.3 (Hazard Zone A, poison gas)
- Division 6.1 (PG I, Hazard Zone A, poisonous liquid).

If a car occupied by guards or technical escorts has an operating heater or air conditioning equipment, it must be the fourth car behind a car requiring Division 1.1 or 1.2 placards.

174.84

STUDENT RESPONSE NOTE 40-46

An _____ rail car must be next to, or ahead of, the car that is carrying the guards or technical escorts.

47

MAXIMUM SPEED

15 MPH
Molten metal
Molten glass

The maximum speed of cars carrying molten metal or molten glass may not exceed 15 miles per hour, if the packaging does not meet the requirements in 173.247.

174.86

48

INDUSTRY RESTRICTIONS**KEY TRAINS**

- Five tank car loads of PIH; or
- Twenty or more loaded cars, trailers, containers, IM tanks
 - Div. 2.3 and 6.1 (Zone A or B, PIH)
 - Div. 1.1 and 1.2
 - Div. 2.1
- Environmentally sensitive chemicals

The railroad industry can and does recommend stricter operating rules than those required by DOT. Additional restrictions apply to “key trains” which are:

- Trains with five tank car loads of Poisonous by Inhalation materials; or
- Trains with 20 or more loaded cars, trailers, containers and intermodal tanks carrying a combination of:
 - Division 2.3 and 6.1 Zone A or B Poisonous by Inhalation materials
 - Division 1.1 and 1.2 Explosives
 - Division 2.1 Flammable Gases
 - and certain environmentally sensitive chemicals.

49

INDUSTRY RESTRICTIONS**KEY TRAINS**

- Maximum speed - 50 mph
- Inspections required
 - Emergency stops
 - Hot box detector stops (if alarm sounds)

Key trains are limited to a maximum speed of 50 miles per hour. When practical, they will hold main track at meeting or passing points. A full train inspection is required at any emergency stop. At hot box detector stops, if an alarm sounds, the train must be inspected. If no defect is found, the train must travel no faster than 30 miles per hour to the next detector – or another 30 miles – for another inspection.

50

INDUSTRY RESTRICTIONS**KEY ROUTES**

- 10,000 loads of HM per year
- More than 4,000 loads of
 - Div. 2.3 and Div. 6.1, Zone A and B, PIH
 - Div. 1.1 and 1.2
 - Div. 2.1
- Environmentally sensitive chemicals

The Association of American Railroads (AAR) recommends that railroads designate certain routes as “key routes.” Key routes carry at least 10,000 loads of hazardous materials a year or 4,000 loads of the special materials previously discussed in frame 48.

It is important to note that key train and key route criteria are not Federal requirements.

51

LEAKAGE**Packages, other than tank cars**

- Repair
- Recondition
- Place in Salvage Drum

Leaking packages, other than tank cars, may not be forwarded as is. They must be repaired, reconditioned or placed in a salvage drum according to the requirements in 173.3.

174.50; 173.3**52**

NONCONFORMING TANK CARS

**Must be repaired, or
Must be approved for movement**

A tank car that no longer conforms to the requirements of the HMR may not be forwarded unless repaired or approved for movement by the Associate Administrator for Safety, Federal Railroad Administration.

174.50**53**

LEAKAGE**Leaking tank car**

- May be moved to safeguard human health and environment
- Limit movement

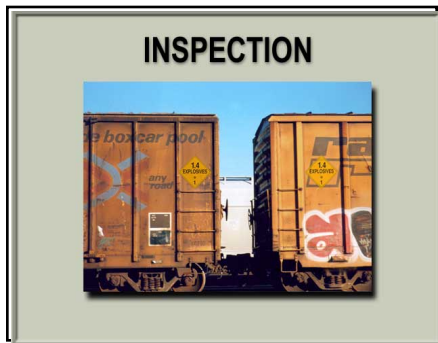
A leaking tank car may be moved without making repairs if necessary to safeguard human health and the environment. Movement must be kept to a minimum and any leaking liquid must be prevented from spreading.

174.50

STUDENT RESPONSE NOTE 47-53

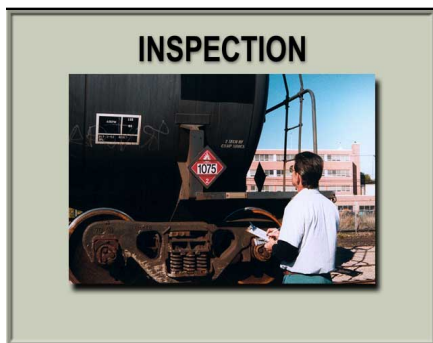
A _____ tank car may be moved without making repairs if necessary to protect human health and the environment.

54



Freight cars carrying explosives should also be checked for leaks. Doors should be closed and secured.

55



A car that's resting unevenly or whose doors or walls are bulging, may have been damaged inside from a lading shift or mishandling.

If the car appears in good condition, the crew can check the placards and markings to make sure they're properly applied. This should be done before pulling it from the shipper's spot or placing it in a train. The placards must match each other and the information on the shipping papers.

Crews can verify placard accuracy by checking the shipping paper for Hazard Class and UN or NA Identification Number.

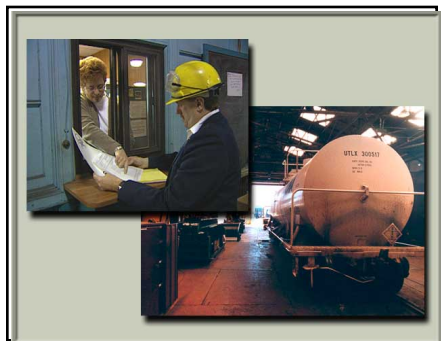
56



No person may fill a tank car overdue for periodic inspection with a hazardous material and then offer it for transportation. Test dates must be current for both tanks and safety valves.

173.31(a)(3)

57



If the car passes its hazmat checks, it can be switched to the local classification yard. There it is given a detailed mechanical inspection of running gear and safety appliances. Then it's placed into a train.

Shipping papers and related documents are given to the train crew.

STUDENT RESPONSE NOTE 54-57

Test ____ on tank cars must be current prior to filling with hazardous materials and offering for transportation.

58



Incidents or accidents involving hazardous materials may require notification to the National Response Center (NRC). The NRC must be notified immediately when, as a direct result of hazardous materials:

- A person is killed, or injured and requires hospitalization;
- Property damage is greater than \$50,000;
- An evacuation lasting more than one hour occurs;
- One or more major transportation routes is closed for more than one hour;
- Aircraft flight patterns are altered.

Immediate notification is also required for incidents involving:

- Radioactive contamination,
- Etiologic (disease-causing) contamination,
- Marine Pollutants when more than 119 gallons of liquid or 882 pounds of solid are released.

The NRC telephone number is 1-800-424-8802. A written report is required within 30 days of the incident whenever the above criteria are met or whenever there has been an unintentional release of hazardous materials.

171.15/171.16



This concludes the instruction and practice portion of this module. Now is the time to assess how well the module taught you. This will be an open book test. There are no “trick” questions. Unless instructed otherwise, please complete the **Module 6C Test**. The **Module 6C Test** begins on page 24 of your Student Manual.

Instructor Note:

Please check test answers, record scores, and update training records. Review test results with students.

STUDENT RESPONSE NOTE ANSWERS begin on page 26.

Module 6C Test

1. Division 2.3, Hazard Zone A materials may be transported in the same rail car as Oxidizers.
 - a. True
 - b. False
2. A tank car loaded with Class 3 (Flammable Liquids) may be placed next to the engine in a train.
 - a. True
 - b. False
3. Generally, a carrier must forward hazardous material shipments promptly and within how many hours after acceptance?
 - a. 8
 - b. 16
 - c. 24
 - d. 48
4. A flatcar loaded with an IM portable tank transporting Class 3 (Flammable Liquid) may be placed next to the engine in a train.
 - a. True
 - b. False
5. A carrier may transport a cargo tank containing a hazardous material in TOFC/COFC service without the approval of FRA's Associate Administrator for Safety under which of the following circumstances?
 - a. There is an emergency need for the cargo tank to be moved in order to mitigate the consequences of an incident/accident.
 - b. The shipment will be seriously behind schedule if not transported immediately.
 - c. a and b
 - d. None of the above
6. A tank car containing residue of hazardous materials must be separated from the engine or an occupied caboose by at least one non-placarded rail car.
 - a. True
 - b. False

7. The doors of freight containers and transport vehicles may be used to secure loads of hazmat packages if the doors meet the design strength requirements in the AAR's Manual of Standards and Recommended Practices, and the load is within the limits of the design strength requirements of the doors.
 - a. True
 - b. False

8. According to the train placement table in 174.85(d), a placarded car may be placed next to the engine if the train is too short to separate them with a non-placarded car.
 - a. True
 - b. False

Answer Sheets

Student Response Note Answers

- 1-5 A shipper certification is not required on a shipping paper when a railroad transports its own hazardous materials and supplies.
- 6-7 Generally speaking, hazardous materials shipments must be forwarded within 48 hours of acceptance and the consignee must remove the shipments within 48 hours.
- 8-11 In an emergency, a cargo tank containing a hazardous material may be moved without prior approval.
- 12-13 The Segregation Table for Hazardous Materials in 174.81(d) shows which hazardous materials may or may not be loaded, transported or stored together.
- 14-16 An “X” indicates the materials may not be loaded, transported or stored together.
- 17-18 Unloading operations of a tank car must be monitored either by a person, electronically or a combination thereof.
- 19 Packages must be protected from movement or shifting around while in transportation, either by using other freight or by blocking and bracing.
- 20-24 Only shipments that are properly described on shipping papers may be accepted for transportation.
- 25-26 The HMR define a train as one or more engines coupled with one or more rail cars, except during switching operations or where the operation is that of classifying and assembling rail cars within a railroad yard for the purpose of making or breaking up trains.
- 27 The position of cars containing hazardous materials are generally shown on the train consist.
- 28-33 Rail cars placarded Div. 1.1 or Div. 1.2 must be separated from the engine by at least one non-placarded car.

- 34-39 There must be at least five rail cars between a placarded railcar and the engine or an occupied caboose if train length permits.
- 40-46 An escorted rail car must be next to, or ahead of, the car that is carrying the guards or technical escorts.
- 47-53 A leaking tank car may be moved without making repairs if necessary to protect human health and the environment.
- 54-57 Test dates on tank cars must be current prior to filling with hazardous materials and offering for transportation.